AGENT-ORIENTED PLANNING IN MULTI-AGENT SYSTEMS

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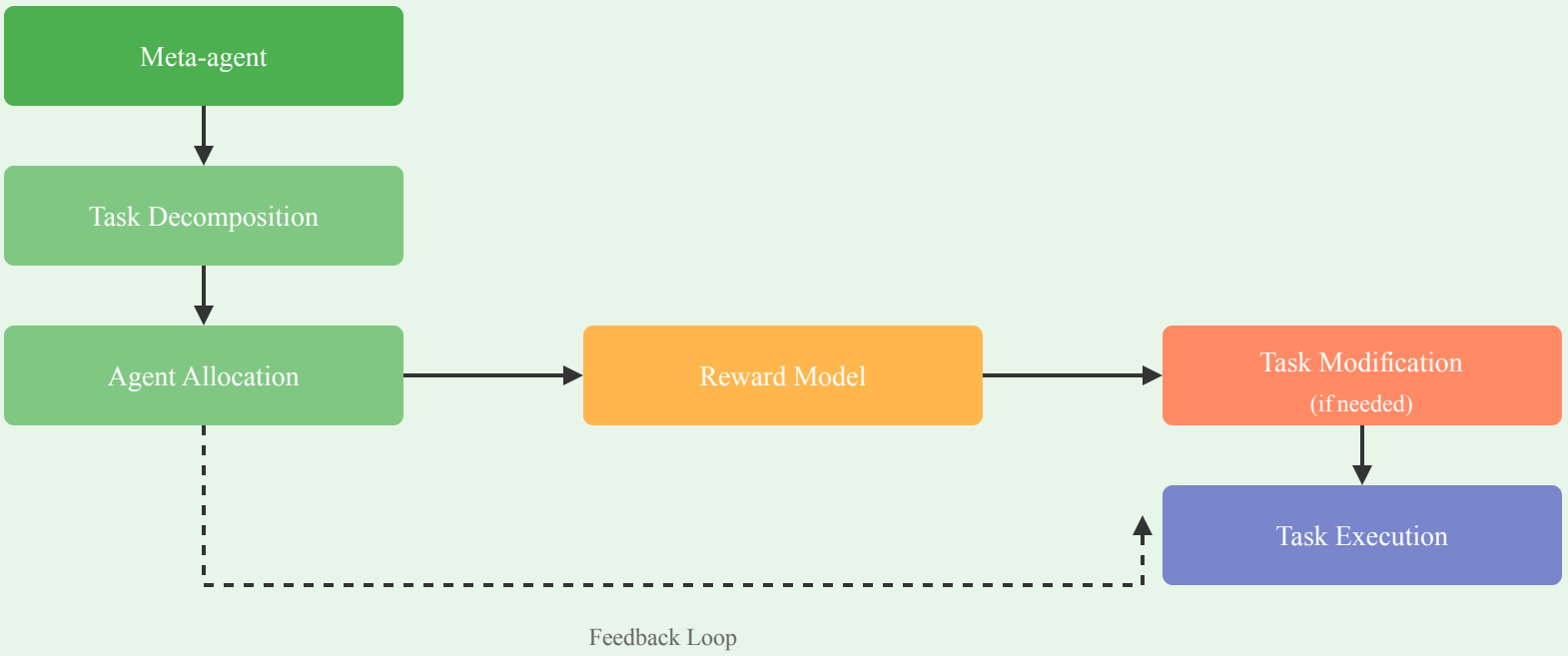
Problem Statement:

How to effectively decompose user queries into sub-tasks and allocate them to suitable agents in multi-agent systems, ensuring solvability, completeness, and non-redundancy?

Methodology:



Results and Findings:

Method	Accuracy (%)	Prompt Tokens (M)	Completion Tokens (M)
Proposed Framework	43.7	1.12	0.38
HUSKY	39.6	0.83	0.15
REACT	37.6	2.47	0.19
GPT-4o	33.3	0.02	0.09

Key Findings:

- Improved accuracy by 4.1% compared to the best baseline (HUSKY)
- Effective task decomposition and allocation with LLMs as meta-agents
- Reward model successfully evaluates sub-task solvability without execution

Key Takeaways:

1. Novel framework for agent-oriented planning improves task accuracy and system robustness
2. Reward model effectively evaluates sub-task solvability without actual execution
3. Feedback loop integration enhances system adaptability and continuous improvement
4. Design principles of solvability, completeness, and non-redundancy ensure effective task execution

Limitations and Future Work:

Limitations:

- Increased computational costs compared to single-agent systems
- Assumes comprehensive and accurate agent descriptions

Future Work:

- Optimize computational efficiency and scalability
- Implement dynamic agent capability updates
- Conduct real-world deployment studies for validation